

being unpatentable over U.S. Patent No. 5,604,360 issued to Zhang, et al in view of Mizutani. The rejection asserts that Zhang allegedly teaches each element of the claims except for a MOS capacitor charge transfer and a quartz substrate or image sensor, which is allegedly taught by Mizutani.

The present invention is directed toward a semiconductor device having a plurality of crystals extending in a crystal growth direction. Thus, when the charge transfer direction coincides with the crystal growth, the carriers can move continuously in the crystal semiconductor film (see page 3, lines 18-24).

None of the cited art teaches or suggests this feature. In Mizutani, Figures 7A to 7C show nuclei 72 formed and the nuclei are grown into mutually contacting islands, and a continuous film 73 is obtained by further growth (col. 4, lines 9-17). The continuous film 73 that is obtained is the first semiconductor film for a photosensor 7 and MOSFET 8 (col. 3, lines 1-61). However, as the grains become larger from the nuclei from Figures 7A to 7B, each of the grains has a plurality of crystal growth direction from the nucleus therein. Thus, the crystal growth proceeds from the nucleus in all the directions in each grain. Therefore, the carriers cannot move in only one direction in the continuous film 73. Because different crystal growth directions are included at the interface between a grain

and an adjacent one in the continuous film 73, the interface acts as a barrier to prevent the carriers from moving continuously. Although Zhang discloses a crystal growth direction is parallel with a substrate 101, the reference is not related to a charge coupled device.

In view of the foregoing distinctions, Applicants respectfully submit that independent Claims 1, 2, 16, and 19 are patentably distinguished over the cited art. Applicants respectfully submit that Claims 1, 2, 16, and 19 are in condition for allowance, and Applicants respectfully request allowance of Claims 1, 2, 16, and 19.

Claims 3-6, 11-14, 17-18, and 20-23 depend either directly or indirectly from one of the independent claims. Each dependent claim further defines the independent claim from which it depends. In view of the foregoing remarks regarding Claims 1, 2, 16, and 19, Applicants respectfully submit that Claims 3-6, 11-14, 17-18, and 20-23 are likewise in condition for allowance. Applicants respectfully request allowance of dependent Claims 3-6, 11-14, 17-18, and 20-23.

Summary

In view of the above amendments and remarks, all of the claims should be in condition for allowance. A formal notice to that effect is respectfully solicited.

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Respectfully submitted,

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